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EXAMINER

NGUYEN, KHIEM D

ART UNIT PAPER NUMBER

2823

DATE MAILED: 06 20 2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/033,233

Applicant(s)

AKRAM, SALMAN

Examiner

Khiem D Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 21 March 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☐ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

The translation of the foreign language provisional application has been received

- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121

## Attachment(s)

- 1) ☒ Notice of Reference Cited, PTO 852
- 2) ☐ Information Disclosures, PTO 854
- 3) ☐ Interview Summary, PTO 853
- 4) ☐ Other

### DETAILED ACTION

The non-final rejection as set forth in paper No. (3) is withdrawn in response to applicants' amendments.

A new rejection is made as set forth in this Office Action.

Claims (1-20) are pending in the application.

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6-14, 16-18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Rostoker et al. (U.S. Patent 5,780,928).

In re claims 1, 12, and 16-17, Rostoker discloses a method of making an IC chip package having an IC chip with an active surface, the active surface having extending therefrom an electrical connector in electrical communication with IC chip, the IC chip being mounted upon a substrate, the method comprising: providing a container (FIG. 1b, 170a, 176) disposed upon the substrate; and injecting a grease (FIG. 1b, 114a) in contact with the active surface of the IC chip (FIG. 1b, 130a) such that the grease is enclosed by the container and the substrate (col. 6, line 7, col. 10, lines 36-58, col. 14, line 62); and is in contact with the active surface and the electrical connector (FIG. 1b, 150a, 150b).

dam structure (FIG. 1b, 112) that contacts the grease (col. 1, lines 20-28 and FIG. 1b)

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In re claims 3, 13, 18 and 20, Rostoker discloses operating the IC chip to generate heat therefrom and conducting the heat from the IC chip and the electrical connector to the grease, to the container, and to the ambient (col. 8, line 60 to col. 9, line 2).

In re claims 4 and 11, Rostoker discloses wherein the container comprises a metal that has a thermal conductivity greater than the thermal conductivity of the grease.

In re claims 6 and 9, Rostoker discloses wherein the IC chip package comprises IC chip elements (FIG. 1b, 130a), wherein the container disposed upon the substrate (FIG. 1b, 112) encloses a volume external to the IC chip elements, and wherein the injecting a grease comprises the filling with the grease of the volume enclosed by the container (col. 10, lines 36-58).

In re claim 7, Rostoker discloses wherein the container is in contact with the active surface of the IC chip (FIG. 1b).

In re claims 8 and 10, Rostoker discloses wherein a flip chip is disposed over the active surface of the IC chip, wherein the container is a dam structure, and wherein the dam structure is in contact with each of the IC chip, the flip chip, and the grease (FIG. 1b).

In re claim 14, Rostoker discloses wherein the substrate is a flex substrate (col. 9, lines 21-25).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 15, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rostoker et al. (U.S. Patent 5,780,928) as applied to claims 1-4, 6-14, 16-18 and 20 above, and further in view of Hunadi et al. (pp. 28-32, Advanced Packaging, April 1999).

In re claims 5, 15 and 19, Rostoker discloses most aspects of the instant invention but fails to explicitly disclose wherein the grease has thermal conductivity in a range from about 2 Watts/m·K to about 5 Watts/m·K, a dielectric constant in a range from less than about 6 to about 9, and a melting point in a range from about 190° C to about 220 °C.

Hunadi discloses in (tables 1-3), a thermal grease A having a thermal conductivity of 3.3 Watts/ m · K, a dielectric constant of 7.62 and a melting point at 200°C. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Rostoker and Hunadi to enable the grease of Rostoker to be formed and furthermore to achieve superior performance over the conventional thermal

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*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (703) 306-0210. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-9179 for regular communications and (703) 746-9179 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

K.N.  
June 11, 2003

